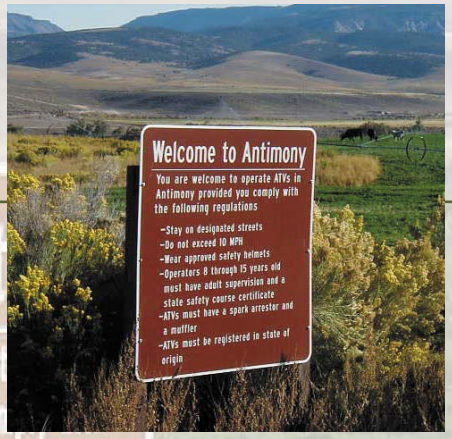
2E

Use Linkages



SUMMARY OF IMPORTANT ISSUES AND TRENDS

- Providing for multiple uses of the land is well established in the statutes, regulations, guidelines, and policies governing the management of the National Forest System and is one of four main goals in the USFS' current strategic plan.
- The "Linkages to the Land Framework" categorizes use linkages based upon the legal agreements that define how people interact with the land. Three basic categories of use linkages are: *general access uses* (authorized uses that do not require a permit); *permitted uses* (authorized uses that require a permit); and, *illegal uses* (uses that are not authorized or that violate permit agreements).
- General access uses constitute the majority of uses on all three forests, but are not well monitored and require indirect methods of management. The USFS manages general access uses through a variety of means, such as forest planning, rules and regulations, public education, interpretation and signage, strategic placement of infrastructure, and directing access to certain areas while diverting it from other areas (road closures, travel restrictions, area designations).

- Access to the National Forests is the one use privilege upon which all other use privileges are based. While the specific character of open access differs on the three forests, they are all experiencing increasing use pressures, especially in terms of general access uses that may no longer be non-subtractive. This explains why access issues are some of the most controversial issues in the forest plan revision process.
- Aside from accessing the forest and engaging in visitation and recreation for personal enjoyment, most other activities that occur on National Forest System lands require a permit. Activities that involve *extraction* of resources, *management*, *exclusion or management of other peoples' uses*, and the *ability to transfer these privileges* to other people require some form of written permission from the USFS or state agency in charge of a particular natural resource.
- Written agreements that permit people to engage in various uses of land and resources help to define the nature of their linkage to the land. These agreements generally define privileges and responsibilities, and specify when, where, and how, and under what conditions that use can occur. The extent to which the terms of these agreements actually are met depends upon the responsibility of the users and the monitoring and enforcement capabilities of the USFS.
- When people are required to obtain a use permit, the USFS knows who the users are and can track and analyze data on these users. Contact information on these users, particularly their zip code, can help the USFS to analyze the off-forest impacts of activities that occur on the lands it manages. Other useful information can include geographic region of use, amount of resource used, time of use, economic arrangements associated with the use, and specified responsibilities that the user accepts as part of the terms of the permit.
- Implementation of the INFRA database system is giving the USFS a potentially powerful tool for identifying, assessing, and contacting the people who are engaged in permitted uses. The USFS is still transitioning to this system so not all types of data are entered, consistent, and easily accessible.
- Data from simple standardized forms, recording processes, and non-confidential aspects of incident reports should be recorded and added to INFRA to help estimate and monitor open access and illegal uses.
- Because of the literally thousands of users and potential linkages, use linkage analyses should be resource-based and site- or issue-specific. Such analyses are most useful when done on a strategic basis as information needs arise.

OVERVIEW

Use linkages describe the ways in which people actually use the National Forests. These linkages imply a physical connection to public land. The USFS manages the National Forests under Congressional directives and administrative guidelines that emphasize multiple-uses within the ability of the land to sustain those uses. Providing for multiple uses is one of the four current strategic goals of the USFS along with ecosystem health, scientific and technical assistance, and effective public service.

Descriptions of the multiple uses of National Forest System lands generally refer to the particular physical resources that people use. Thus, people commonly talk about using public lands for water production, grazing, timber harvesting, seed gathering, hunting and fishing, mining, and recreation. Our approach to describing use linkages to public lands is slightly different. It categorizes uses based upon the legal agreements that define how people are allowed to use the land. These agreements structure people's relationships and linkages to the land.

As presented in the Linkages Framework (*located in Appendix A2*), there are three basic categories of use linkages: general access uses; permitted uses; and illegal uses. Use linkages are composed of five basic privileges by which people can use public land and resources: access, extraction, management, exclusion of others, and transferability. Seven other factors help to define, characterize, and evaluate the nature of the relationships (linkages) that users have to the land: the legal basis for the use of NFS land and resource(s); the time dimension associated with the use; geographic specificity of the use; surface occupancy rights; conveyance privileges; economic aspects associated with the use; and, responsibilities associated with use.

The types of use linkages that people have to public land are defined by different combinations of these privileges, responsibilities and conditions on use. Assessing use linkages involves describing both the *nature of the linkages* and the *people who are in those linkages*.

This section focuses on distinguishing between different types of use linkages that people have to the land and resources of the National Forests. Since the USFS manages most uses of the National Forests, our discussion of use linkages relies primarily on data gathered and maintained by the USFS. In particular, we have extensively reviewed the types of data that are maintained in the USFS INFRA Database System and the USFS and State of Utah permit processes as well as forms that are used to grant individual users permission to use the National Forests.

FINDINGS

A wide variety of general access, permitted, and illegal uses occur on the Dixie, Fishlake, and Manti-La Sal National Forests. The people who use these three forests tend to be from the vicinity of the forests or from other parts of Utah, while most of the users who live outside of Utah come from surrounding or nearby states.

Use has grown since the existing forest plans were written, largely due to the proximity of these forests to growing regional metropolitan centers (Utah's Wasatch Front, Las Vegas, and Denver) and major interstate highways and to developments in OHV technology. Amenity-based growth in rural areas and Utah's effective promotion of recreation and tourism has also contributed to the growing use of public lands in Southern Utah.

General Access Uses

Most open access uses involve recreational and aesthetic enjoyment of the forests. The USFS has identified unmanaged outdoor recreation as one of its most pressing problems. Chief of the USFS, Dale Bosworth, said, "Today, the nation's forests and grasslands face four great threats that get lost in the debate over logging and road-building. These are fuel buildups and large fires, loss of open space, unwanted invasive species, and unmanaged outdoor recreation." He continued in his remarks saying,

> "Americans are playing outdoors in record numbers, and that's good. It gives them a stake in the land, and most care about the land a great deal and are careful to protect it. But a few are not, so we've got to manage that use.
>
> Let me illustrate what I mean through the example of off-highway vehicles. This is a legitimate use of national forest land. Managed properly, it can provide great recreational opportunities for many people, and it's growing in popularity. Tens of millions of OHVs are now in use-far more than even 10 years ago. With all those millions of users, even a tiny percentage of problem use presents us with a big and growing problem. Each year, unmanaged OHV use leaves hundreds of miles of wildcat roads and trails, causing damage to meadows, streambeds, and other sensitive areas. We have got to better manage this use to protect our natural resources."

In general, general access uses are allowed as long as they are not subtractive (one person's use does not subtract from another person's use), and it appears that this is no longer the case with some general access uses of the National Forests. Direct impact to the land from a particular use and interference with other uses are the reasons that most activities have been brought under a permitting system. Permitting began nearly 100 years ago as the USFS began to exercise more direct management over grazing, timber harvesting, mining, and other activities. Until recent decades, there has been no pressing need to manage forest access for most recreational uses since most people recreated by foot or horseback once they left the main roads. At present, new mechanical means of accessing formerly remote and off-road areas of National Forests is resulting in growing, extensive, and sometimes careless use. This is triggering a discussion of the need to track and manage unregulated general access uses of forests' resources, particularly for recreation.

General access uses constitute the largest category of use linkages. For instance, the USFS asked people how they use the Manti-La Sal National Forest when they solicited input on their forest plan revision. People's responses included a wide variety of uses that are general access (as reported in the Manti-La Sal National Forest Newsletter, February/March 2003). Their responses included: ATV riding/4-wheeling, backpacking, bicycling, bird watching, camping, climbing, cross-country skiing, dog sledding, exploring, family gatherings, hiking, horseback riding, jeep touring, mountain biking, nature study, peak bagging, photography, picnics, pleasure trips, relaxing, rock climbing, scenic drives; skiing (cross-country, downhill, Nordic), sledding, snowboarding, snowmobiling, snowshoeing, solitude, tubing, visiting ancient ruins, walking, wildflower viewing, and wildlife viewing.

Infrastructure on the forests is well documented and deserves mention. Trails, culverts, roads, ditches, diversions, dams, restrooms, buildings, campsites, and other facilities are carefully maintained and recorded in the USFS' INFRA database system. These physical

assets imply that the forests are being used in particular ways in particular places, but they do not document the amount of use or by whom. Some records are kept on campground capacities, trail use at least at the trail heads, and traffic patterns. Trail monitors, road vehicle counters and surveys are occasionally employed to collect some evidence of amount of use if not of the specific users. Trail head and facility use is generally seasonal and fluctuates based upon various factors, making the accuracy of random or periodic monitoring for estimating use somewhat problematic. Camp ground concessionaires keep few records (vehicle numbers, head counts) and are not a consistent source of information on the users. Where use is general access and permits are not issued, there are limited data on how the forest is being used and who is using it.

General access uses are difficult to assess because few data sources are available on people who engage in these legal but non-permitted uses. Some information is available through recreation surveys, observations of USFS staff, trailhead registers, and other voluntary sign-ins. Results of the National Visitor Use Monitoring (NVUM) survey provide the most current and comprehensive estimates of general access use.

The Manti-La Sal NVUM survey results were issued in August 2002. A few survey results give a brief profile of the users and their uses of this forest. Estimated annual visits to the forest are 804,301 with 868,610 annual site-specific visits and 1,202 wilderness visits. Visitors tend to be male (78%), white (93%), under 50 years of age (80%), and from Utah. Day use is most common, with the average length of stay being 20.6 hours and 17% of visitors staying overnight. Most visitors only access one site during their visit (80%). The top five recreational activities of the visitors are viewing natural features, viewing wildlife, relaxing, hiking/walking, and driving for pleasure. The most used facilities/areas are: nonmotorized trails, forest roads, scenic byways, picnic areas, and motorized trails. Survey respondents said facilities that enable access is important to them, implying that traveling around the forest was the major activity.

The Fishlake NVUM survey results were issued in August 2003. Estimated annual visits to the forest are 447,270 with 547,546 annual site-specific visits and no wilderness visits (there are no wilderness areas on the Fishlake National Forest). An even higher percentage of visitors are male (86%) and white (99%) than on the Manti-La Sal, but the age distribution of users shows a slightly older population (those under 50 years of age were 62% of the visitors) and most of the visitors are from Utah. Visitors tend to stay longer on the Fishlake than on the Manti-La Sal, with the average length of stay being 44.8 hours and 39% of visitors staying overnight. Most visitors only access one site during their visit (80%) like they do on the Manti-La Sal. The top five recreational activities of visitors are viewing natural features, viewing wildlife, relaxing, fishing, and driving for pleasure. The most used facilities/areas are: nonmotorized trails, forest roads, developed campgrounds, boat launches, and fishing sites. Clearly, there are some differences in the general access use patterns between the two forests, with the Fishlake generally being more of a destination forest where people stay overnight and engage in more camping and fishing (undoubtedly due to the presence of more bodies of water and less motorized activities).

USFS staff manages general access uses through a variety of direct and indirect means, such as forest planning, rules and regulations, public education, interpretation and signage, the strategic placement of infrastructure, and directing access to certain areas while diverting it from others. Providing road and trail opportunities, implementing travel restrictions,

designating areas for certain uses, or area closures are all means by which the USFS works to promote or restrict the geographic range of these uses. Since general access uses involve being able to access the forests, transportation routes, passage, and the freedom to move about the forest are important issues. Roads are controversial because access is the one privilege that most people enjoy on the forests and roads and trails are key elements to this access.

Trail closures have been a means of managing recreation and ground conditions in forests for many years. In areas showing high impact or proliferation of unauthorized trails, the USFS staff post signs, install obstacles, remove trails or roads and implement various forms of enforcement. Environmentalists, hikers, bicyclists, campers, snowmobiles, skiers, equestrians, and off-highway vehicles (OHVs) of a variety of types and sizes contribute to a set of special interests competing for access, trails and roads. OHV organizations generally oppose trail or road closures, blaming environmentalists for access restrictions, while environmentalists blame OHV operators for not keeping to authorized trails or roads. Many groups are organizing politically to be involved in the debate over OHVs, and OHV use is one of the most controversial issues involved in these forest plan revisions. A general increase in OHV/ATV use has escalated this as a key forest issue.

Permitted Uses

To engage in many uses of National Forest System lands or to claim and extract the resources that are found on those lands, individual users must obtain a permit, easement, lease, contract, or other form of permission. In the following discussion, we will use the term "permit" in reference to all these various forms of legal agreements whereby people obtain permission for various uses.

Permits are required to engage in uses such as timber harvesting, grazing, hunting, fishing, forest products removal (gathering or removing firewood, posts and poles, seeds and seedlings, ornamentals), water diversion and storage, or mineral development. Permits are also required for a wide variety of special uses that generally involve placing and maintaining structures or facilities on National Forest System lands or providing services to other users of those lands. Some discussion of the permitting system, the nature of the agreements between government agencies and the users contained in various permits, and what the USFS does with permit data will shed light on understanding permitted uses.

The Permitting System

Most uses of the National Forests that involve something other than accessing the land for one's own enjoyment require a permit of some sort. Even some personal enjoyment activities require a permit when the use is dangerous or the USFS needs to monitor that use for some reason (e.g., high-risk recreational uses such as wilderness camping). Activities that entail resource extraction or management, or that allow access for some users while excluding other users, generally require permits. Such uses can be either commercial or non-commercial in nature. As an example, gathering of forest products (timber, fire wood, seeds, posts and poles) is generally permitted in order to control the amount of use in sensitive areas and to oversee the activities of commercial and personal use forest product harvesters and gatherers.

Permitted uses are controlled for three reasons: to monitor the physical impact of *use* to the land and its resources; to allocate the social and economic benefits of resource use to

particular *users* (when general access is no longer viable); and to collect fees owed to the US government for the use of these resources. The authority to exercise oversight of particular types of resources and to issue permits for people to use those resources resides with different government agencies. This divided authority requires coordination between the state and federal governments.

The USFS exercises general oversight over use of National Forest System lands. Its primary legally-mandated authority comes from controlling access to the land. It also issues permits for activities that involve disturbance to the land's surface, use of vegetation (timber, grazing), and occupancy of or conveyance across the land's surface. These permits are allocated by bid or fee for resources with commercial value and by other rules of priority for resources that may not have commercial value but for which the number of users must be limited (e.g., based upon date of application).

The State of Utah exercises oversight over water, minerals, and wildlife resources located on federal lands. The State also employs allocation rules based upon priority dates (especially in relation to water, minerals and wildlife) and the need to limit use (e.g., by lotteries in relation to game permits). However, when these resources for which the State issues permits are located on federal NFS lands, the USFS is involved in permitting access to those public lands to extract the resources, and in stipulating conditions on how those resources can be extracted so as to minimize disturbances to the land.

The Nature of Agreements Contained in Permits

Permits and related resource use agreements establish the legal right of certain people or groups to use a particular resource. They also set stipulations on how much and in what manner the resource can be used so as to minimize disturbance to the land and to other users of the land. In general, permits and related agreements cover the twelve factors discussed above that define the nature of people's linkages to the land and its resources. The twelve factors include the five privileges of access, extraction, management, exclusion, and transferability as well as the seven factors that describe more specifically the legal basis for the use, time dimensions associated with the use, geographic specificity of the use, occupancy issues, conveyance issues, financial arrangements, and responsibilities of the user. The agreements address these factors either explicitly in the permit form itself or through reference to the legal authority under which the permit is issued.

The USFS' permit application processes and the permit forms it utilizes specify certain conditions on land and resource use. The process and the permits make clear that uses must be consistent with federal, state, and local laws, regulations, special orders, and policies that apply to the national forests. These uses must also: be consistent with the forest plan; not endanger public health or safety; not require exclusive or perpetual use or occupancy; and, not interfere with administrative use by the USFS, with other authorized existing uses, or uses on adjacent nonfederal lands. The users cannot owe money to the federal government from prior authorized uses, and cannot engage in a variety of other illegal activities (e.g., gambling, sexually-oriented commercial services) or uses not authorized to occur on National Forest System lands (e.g., paramilitary training or exercises, disposal of solid waste or storage of radioactive or other hazardous substances). While these general conditions apply to all permitted uses, the details of individual permit agreements between the USFS and users vary considerably due to the specific conditions and management objectives for different sites on the forests.

For commercial uses of National Forest System lands, the USFS tries to ensure the technical and financial capability of the user to undertake the proposed use or occupancy and to fully comply with all the terms and conditions of the permit or authorization. Commercial uses generally require a business plan, operating plan, liability insurance, posting of a bond, licenses or registrations, inspection and monitoring, and other documentation designed to ensure that the business entity is responsible and solvent and that it will complete reclamation and other activities that might be required at the end of the use period.

State of Utah permitting procedures for utilizing natural resources follow a similar pattern to those of the federal government. Rights to use resources are established through application and authorization processes whereby state agencies issue permits of various sorts to individual users. The general conditions of use are governed by state laws, regulations, orders, and policies, while more detailed conditions of use may be stipulated in the permit documentation.

Both federal and state permit forms contain three other common features. First, they generally specify that the permitteee's use cannot interfere with the legally authorized access or uses of other individuals. When specifically mentioned in the permit form, this is referenced through the phrase, "subject to all valid and existing rights…." Second, the permit forms require the signature of the applicant or their legal representative. The signature line is at the bottom of the form under all of the text outlining the conditions of the permit. In some instances, this signature line is preceded by a phrase such as: "I have read and understand the terms and conditions and agree to abide by them." Third, these permit forms usually define the government agency's obligations and responsibilities, such as the agency's responsibility to provide access or exercise oversight (e.g., to conduct inspections), conditions for termination of the agreement, and indemnification provisions.

This discussion of permit forms has important implications for understanding use linkages. First, these agreements define people's linkages to the land, sometimes in great detail, and provide important data on use linkages. Second, these agreements establish the rights *and* responsibilities of both the permittee *and* the USFS (or other government agency). Consequently, they are important tools for monitoring use of the land and for furthering stewardship actions on the part of the users. Third, these agreements have legal weight and, collectively, constitute part of the existing social framework within which USFS planning takes place.

Permit Data

Permits and related agreements are an underutilized source of social data. In the past, the USFS discarded permit forms after some period of time, making analysis of its users (the people engaged in those uses) difficult to reconstruct. In recent years, the USFS has begun to track permit data in its new INFRA database system, primarily for management purposes. Here we will discuss the use of these data for social assessment and planning purposes. We will try to illustrate that people and their linkages to the land are more easily identified, assessed, and monitored when those people engage in uses that require written permission and the USFS or (other relevant government agency) keeps track of that information and utilizes it.

Tables 1 and 2 (*in Appendix A2*), which are based upon an analysis of the Dixie INFRA database, illustrate the potential usefulness of permit data for understanding use linkages.

Table 1, "Data on Nature of the Linkages" gives some examples of various types of permitted use linkages related to water, minerals, power lines, outfitters and guides, recreational residences, grazing, forest products removal, hunting and fishing, and several recreational uses (these uses are the rows in the table). The columns illustrate the availability of information on the nature of those linkages, indicating the legal authority for those uses, the permit forms under which the uses are authorized, and whether information on various other factors that define the use is specified (time, place, surface occupancy, conveyance rights, financial arrangements, and responsibilities).

Table 2 (*in Appendix A2*), "Data on People in the Linkages," follows those same use linkage examples (the rows) and indicates the availability of information on people in those linkages. The columns in this table contain information on the databases in which information on the people in the linkages is located, the agency or group in charge of that database, and whether the database tracks information on the type of user, their name, address, other contact information, location of use, amount of resource used, and whether any money was paid for this use. For instance, in the case of hunting, DWR maintains a permit database that gives us all of this information except the location in which a person hunts (we only know they have a license to hunt in the state of Utah, but we don't know if they hunt on the Dixie, Fishlake, or Manti-La Sal National Forests).

The amount of permit information collected by the USFS is very high. Some of this permit data remains in hard copy format only (e.g. the signed agreements and accompanying documentation), but much of the basic information on people who hold the permits is being entered and tracked in INFRA and more could be stored on INFRA in the future. Analyzing all of this data in the abstract would be of questionable utility but using this information for more focused analyses on issue- or site-specific bases could be invaluable for understanding use linkages to the land and for identifying the people who would likely be impacted by different management actions and should be involved in decisions that would affect them. Some examples of how this data could be analyzed are given below in the section "Use Linkages Analyses."

Illegal Uses

As noted previously, there are three different types of illegal uses of public land and resources. The first type of illegal use is one which is not authorized by law or is expressly forbidden, such as engaging in criminal acts on National Forests or engaging in uses that are not authorized for those lands (like paramilitary exercises or storage of hazardous wastes, as previously mentioned, or using OHVs in areas where this is not allowed). The second type of illegal use is when a use requires a permit that the user has failed to obtain. People engaged in uses that require a permit are supposed to have that permit visible or available to present to an enforcement officer upon request. The third type of illegal use is one which is appropriately permitted but the permit holder has violated some of the conditions of that permit.

Illegal uses of National Forest System lands are very hard to document. Some data on illegal uses are contained in the incident reports of USFS enforcement officers, and in the files of enforcement agencies with which the USFS has cooperating agreements (local police, cross-deputized agents). Other illegal uses are evidenced by the damage that they leave behind (archeological theft, vandalism of campground facilities, OHV tracks through riparian areas,

illegally cut timber, overgrazing). Many times, the damage itself goes undetected and the responsible party cannot be identified.

Addressing illegal uses of public land and resources requires that the public take a more active role in helping to manage the land that it jointly owns and in exercising stewardship over that land. It also points to the need for having more USFS staff out in the forest, teaching, enforcing, observing and being seen by the people they serve, as has been advocated by many USFS staff.

USE LINKAGE ANALYSES

This section provides some *examples* of how secondary analyses of permits can be done to look at the off-forest impacts of certain use linkages to the land by looking at where the people who engage in those uses live. Information contained in INFRA that identifies who certain users are and where they are from is used in these sample analyses. Data from Utah's AGRC (Automated Geographic Referencing Center) and the Delorme Atlas (for digitizing the location of cities) were used to develop the following figures. Two examples are provided for each study forest.

Dixie National Forest – Forest Wood Products by Location of Users

Figure 1 maps the residence of wood products permit holders for the Dixie National Forest using zip code areas. An INFRA file from the Dixie National Forest, TIM_RG_PERMITS_VW, provided the sample (n=4946) of users of forest wood products. The permits documented in this data file cover the use of wood products for the following purposes: small commercial sale of fire wood; fuel wood; Christmas trees; oak fuel wood for ceremonial use; seeds - live; nonconvertible products; posts and poles; ornamentals; saw timber – green;

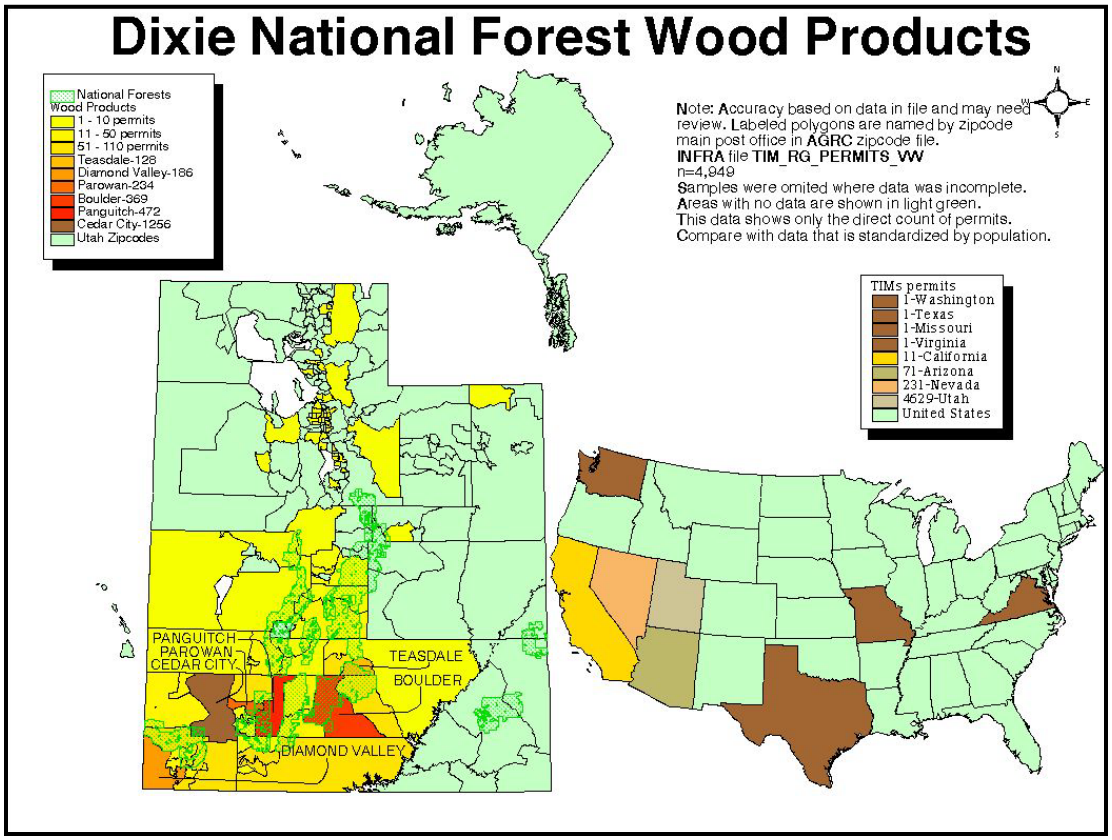


Figure 1

aspen poles; specified stand cutting for insect infestations; seedling plants; green biomass; mine props; and, product sample tests. Permits related to large-scale timber harvesting are not included in this file. Zip code polygons (AGRC) were used to illustrate the geographic distribution of permits. Some data points were lost where zip code fields contained single point locations like post office boxes.

Figure 1 demonstrates the local nature of wood product use, with only 319 out of the 4629 users being from outside Utah. By a large margin, the greatest number of permits is for personal use fire wood (4629 out of 4946, or about 94%). This map shows only the absolute count of the number of permits issued by zipcode, as compared with the next map which adjusts these numbers by population.

Dixie National Forest - Forest Wood Products Adjusted for Population Size

Figure 2 shows numbers of wood products permits by zipcode area adjusted for population size. This map was constructed using the same data as in Figure 1 but "standardizing" it using 1999 population data in the AGRC zip code file. "Normalizing" the permit data used in the previous Dixie forest products map by population size, we see a cluster of communities around the Dixie NF where a relatively large percentage of residents harvest wood products. Communities are shown by name and the data indicate a dependence of those communities on wood products from the local forest. There appears to be no major timber stand harvesting or logging permits in this data file. Smaller commercial firewood and personal firewood were the largest blocks of the permits issued. The inset of the United States indicates the non-standardized data of permits issued to out-of-state residents.

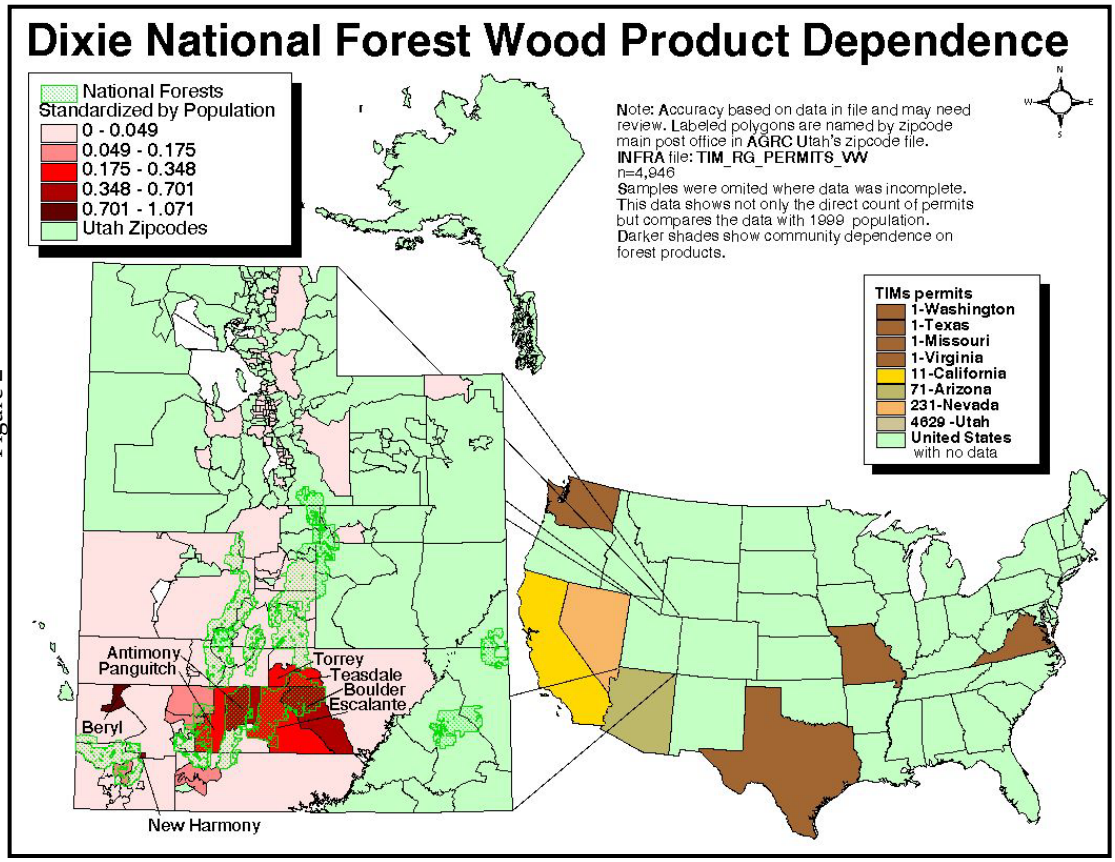


Figure 2

Dixie National Forest - Wilderness Permits

Figure 3 maps the geographic distribution of Dixie National Forest wilderness permit holders by their place of residence. The Dixie INFRA file used for this map was II_WP_SPEEDO_VW. The sample size was n=964 but data quality influences the utility of this information. This data file had many entries where the addresses were missing, where the only address information was a state code, or where the entry in the state code column was actually the name of a city. Thus, many entries could not be used in the analysis. These data gaps resulted in under-representation of out-of-state wilderness users. Data cleaning in an attempt to increase the sample size and accuracy was done through a search for city zip codes obtained by utilizing secondary sources like Melissa Data (http://www.melissadata.com/ (last contacted 12/4/03).

Of the useable data entries, permit holders were concentrated in southwest portion of Utah but, in general, were much more dispersed throughout Utah, the United States, and even the world compared to wood products permits. This reflects the more urban character of the users and less dependency of nearby local communities on this use.

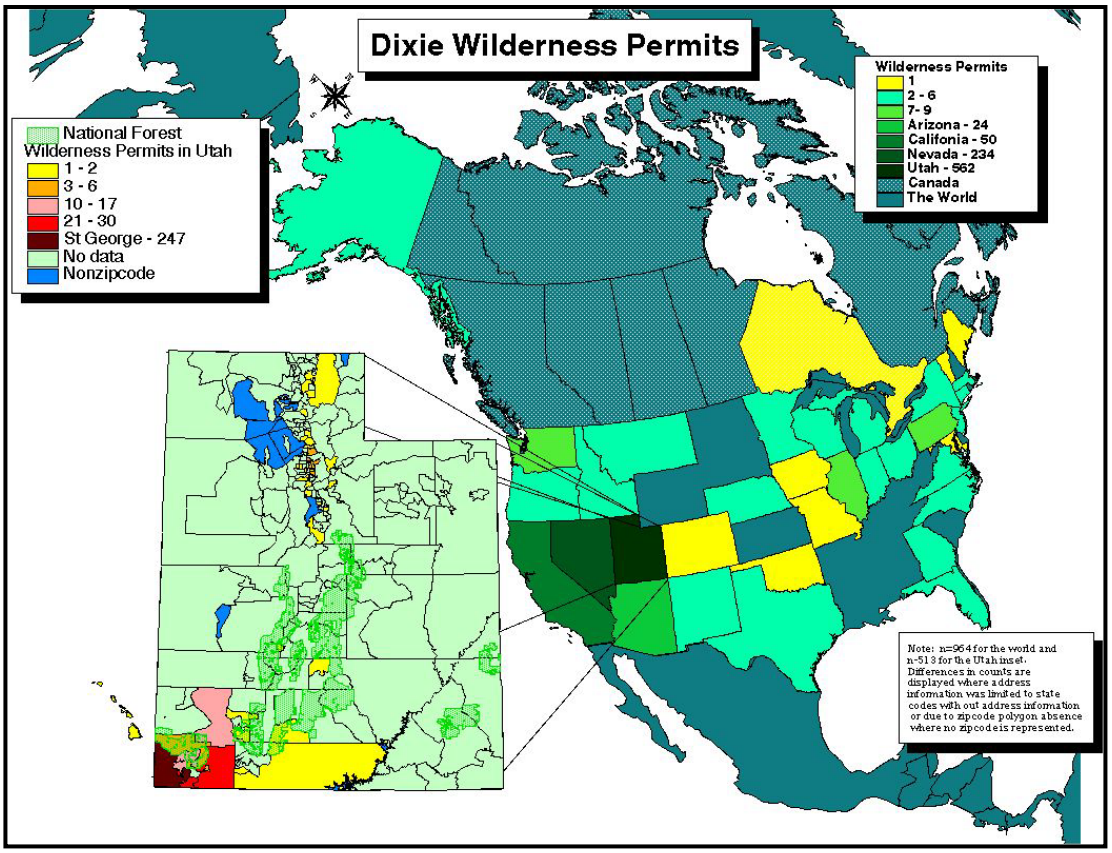


Figure 3

For example, 154 permits were held by people from Las Vegas. Wilderness permits were also held by people from Canada, the United Kingdom, Belgium, France, Philippines, and Tahiti.

Fishlake National Forest – Active Grazing Permits

Figure 4 illustrates the location of residence of people holding active grazing permits on the Fishlake National Forest. These maps were constructed using two INFRA files from the

Fishlake database (II_SU_ALL_CONT_MAIL_LA, II_RGE_PERMITS_V and II_RGE_PMT_USE) along with the base map of Utah's county polygons (from AGRC) and Utah's city and town maps. The most recent census data for the year 2000 were utilized. The actual number of permits is shown with the quantity of permits issued to the city addresses or post office box attributed to city by zip code (using Melissa Data). The number of communities in the sample is 37, and the total number of grazing permits was 243.

Figure 4 shows two maps of Utah side by side for comparison. The number of grazing permits issued to people who reside in each community (map on the left) is contrasted with the normalization of those permit numbers with the population figures (map on the right). These maps demonstrate that grazing permits are held by people living in nearby communities, but the actual dependence of a particular community on grazing depends on its overall population size. Notice that Greenwich is a small dot on the left-hand map because only four grazing permits are held by community residents, while it is a much larger dot on the right-hand-side map because this represents a large percentage of its relatively small population (4/67). Leamington is in a similar situation. Salina and Beaver have about the same number of permits but the relative importance of grazing is higher in Salina. Such analyses can help illustrate the dependence on grazing at a community level.

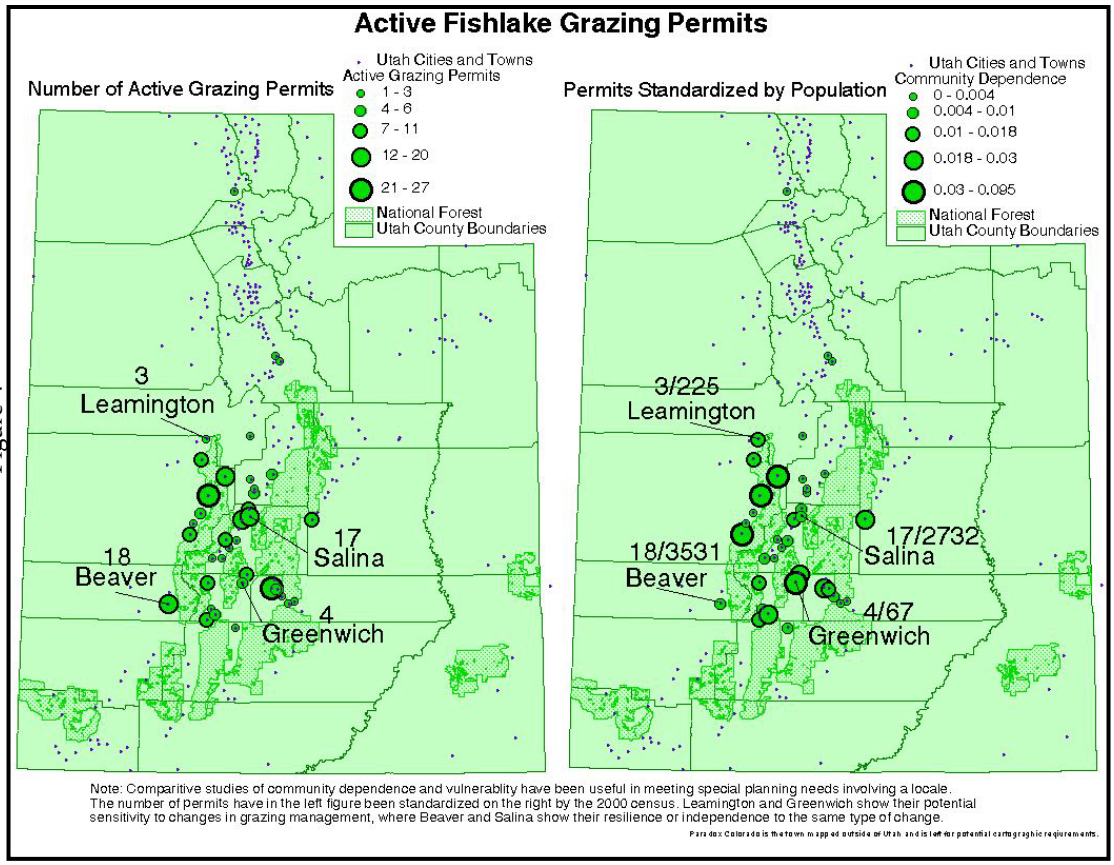


Figure 4

Fishlake National Forest- Special Use Permittees

Figure 5 shows the location of Fishlake National Forest's special use permittees. This figure was produced using the Fishlake's INFRA files of records pertaining to the collection of special use fees from Jan 1, 1997 through billings expected to end on Dec 13, 2004. These files were II_SU_MAIL_LAB_USE_COD and II_SU_FEES_V.

These files were related by columns of user names and the record's addresses and zip codes were used to establish location in Utah and out of the state. These files contained the names of permittees, and since they often have a reason to be contacted by mail, the entries are quite complete. The file included information on 1642 permits that were issued to 354 different individuals for 56 different uses. Figure 5 maps location of the 354 people who hold permits, with additional detail added for Utah.

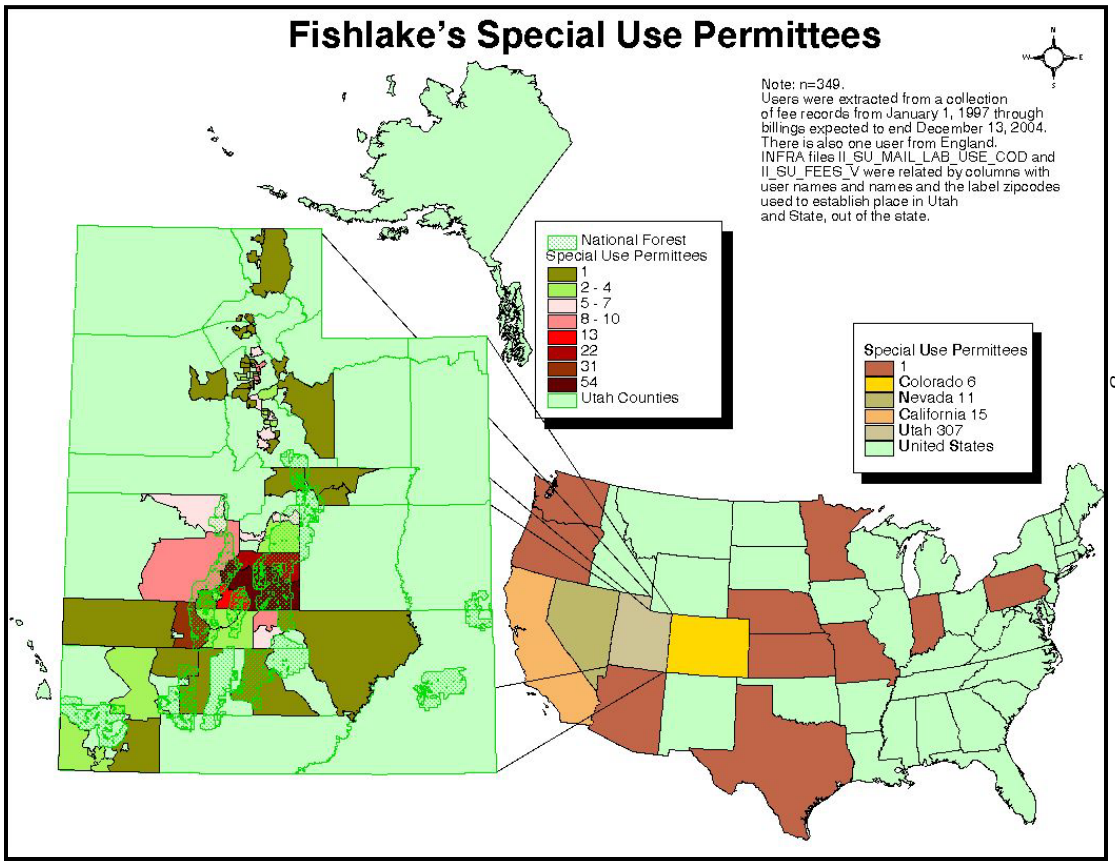


Figure 5

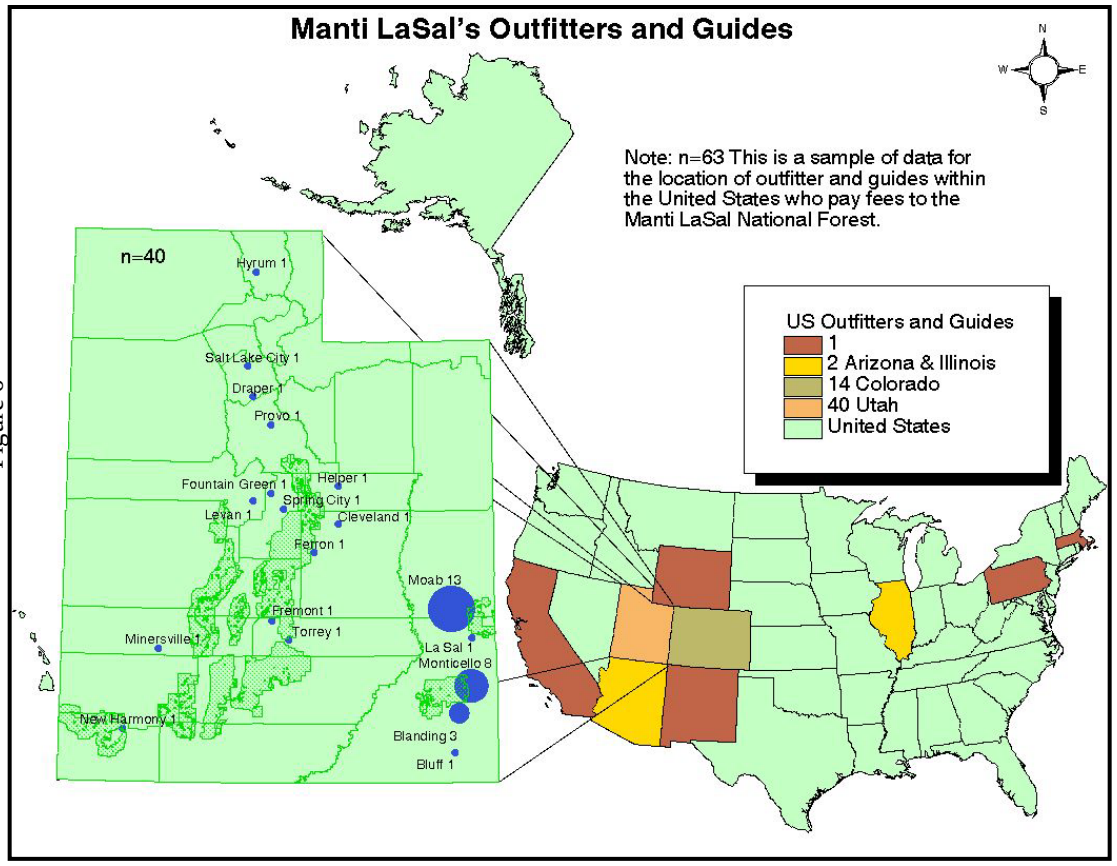
Special uses are quite varied. The largest number of special use permits are for recreation residences (642), water transmission facilities (140), and Outfitter/Guides (112). Other uses covered by these special permits include: cultivation and livestock areas; transmission lines (sewer, electrical, fiberoptic); communication towers (telephone communications; cellular); electrical power (hydroelectric project); water (dams, reservoirs, debris siltation impoundments, streams, windmills, stream gaging stations, water quality stations); oil and gas lines; and land easements. Figure 5 illustrates that many special use permittees were from the area around the Fishlake National Forest. Most of the rest were from Utah (especially Salt Lake City, West Valley, and Heber) but some were dispersed in surrounding states and throughout the United States. This indicates a mix of local and non-local as well as urban and rural residents hold these permits.

Manti-La Sal National Forest - Outfitters and Guides

Figure 6 shows the location of outfitters and guides that hold permits on the Manti-La Sal National Forest. This figure was created from data contained in the Manti-La Sal's INFRA

file named II_SU_FEES_V. City and location files were used to display the location and spatial dispersal by point locations of cities. The dots represent the number of outfitters and guides in a particular location (the size of the dot represents the relative number of permits). There is a total of 57 permits, with 40 of these being held by people who reside in Utah.

Figure 6



This figure shows that the largest concentration of holders is in communities located in the southeast portion of the state, especially Moab and Monticello. The rest of the outfitters and guides are interspersed throughout Utah and in the southwest corner of the neighboring state of Colorado. This analysis shows the preponderance of local involvement in and benefit from this permitted activity.

Linkage of Forest Dams to Cities on All Three Forests

Figure 7 maps the location of cities that are nearest to dams located on all three forests. This figure was produced using the file II_WH_DAM_NID_OUTPUT_V from the NID Database (National Inventory of Dams). The purpose of this file was for the safety of communities that are nearby and downstream of dams located on the forests. This information is clearly important to protect communities that could be impacted by dam failure. However, it also demonstrates the dependence of local communities on the water resources of nearby forests and the need to maintain water structures on public lands. Since the USFS maintains much information on facilities located on the forests, this example is offered as an illustration of how this data could be utilized.

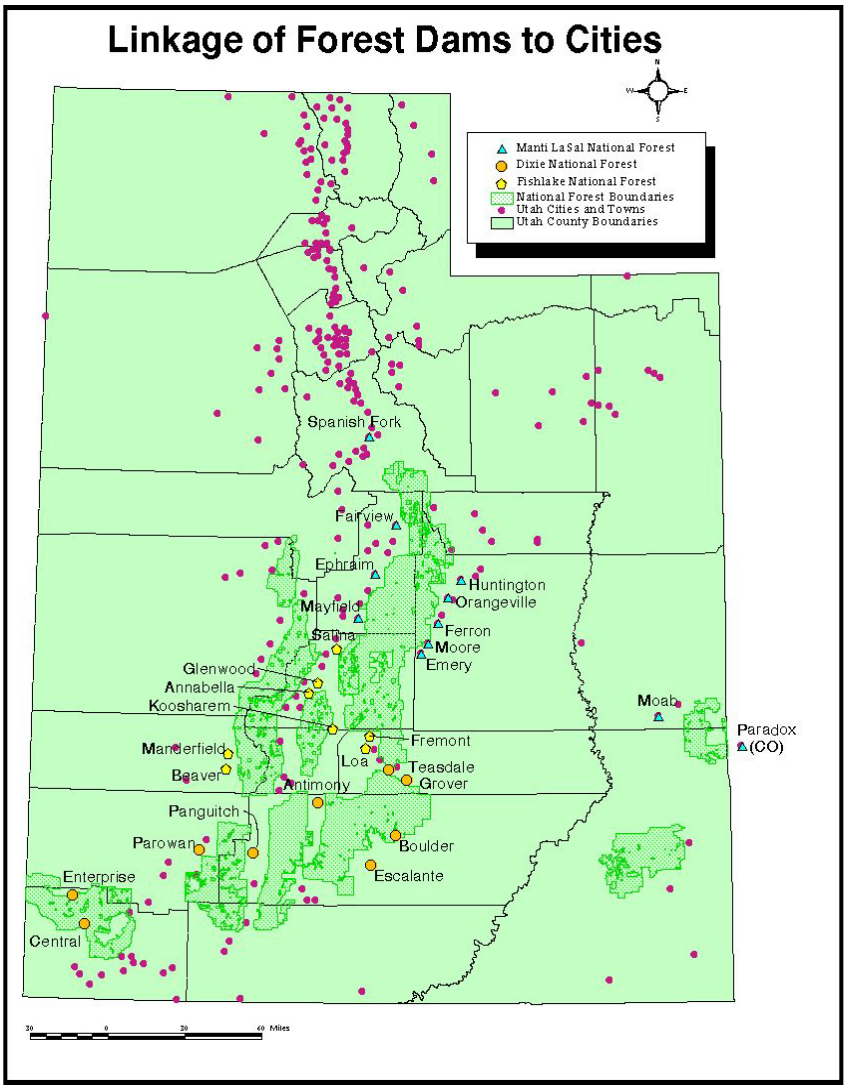


Figure 7

CONCLUSION

This section has focused on describing use linkages to National Forest System lands. These linkages can be described in terms of the nature of the relationships that various users have with the land and in terms of the people who are in those linkages. Three basic types of use linkages are general access uses, permitted uses, and illegal uses. The ability to assess and monitor use linkages is highest when individuals are permitted to engage in those uses through written documentation of some kind. In those instances, the legal documents granting permission to the user describe the nature of the linkage and agency tracking of the permits helps to identify the people who are in those linkages. While the usefulness of permits for social assessment is obvious, data quality and availability is variable. All user permits should be recorded in INFRA and a standard set of social data (name, address, zip code, cost, economic value of permit and, when possible, the amount and location of resource use should be recorded). Currently, much valuable existing data are lost because they are not included on the INFRA system, like Christmas tree and campground permits. When data is recorded and maintained, attention should be given to its accuracy, completeness and comparability to ensure its utility for analysis of human dimensions of NFS lands.

General access linkages are more difficult to assess because the users are more diverse and dispersed, and it is more costly and time-consuming to collect, store, and analyze the data. Standardized forms and data collection processes should be developed for improving data collection, like the NVUM survey, but for day-to-day forest use. Examples of these forms would be standardized trail registers with standardized signs and data requests (name, zip code, number in party, route, etc.) and recording sheets for regular ranger routes (parking lots, numbers of cars, state of license plates, etc.). Finally, steps can also be taken to record illegal uses. Non-confidential data from incident reports should be included in INFRA, e.g., type and location of violation, resource impact, economic value of damage, offender's zip code, and category of illegal activities (categorized as discussed previously as non-authorized use, engaging in use without proper permit, or violating permit requirements).

The ability to assess, manage, and monitor general access and illegal use linkages is currently very difficult because the users are unknown to the USFS, data on these uses are hard to obtain, and management approaches are much more indirect. Besides analyzing the direct interface that users have with the land, an analysis of where those users live helps to assess the dependence and influence of USFS management outside the boundaries of the lands that it oversees.